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EXAMINER	
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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/568,075
Filing Date: February 13, 2006
Appellant(s): YAMAMOTO ET AL.

Sadao Kinashi (Reg. No. 48,075)
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 10/01/2010 appealing from the Office action mailed 12/04/2009.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1-20 are pending and are the subject of the appeal.

Claims 1-20 stand rejected.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the

subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

4,666,796	LEVINE	5-1987
2003/0104651 A1	KIM ET. AL.	6-2003
JP 2005-123297 A	SUZUKI	12-2005
4,236,296	WOOLHOUSE ET. AL.	12-1980
2004/0023487 A1	SHIOMI ET. AL.	02-2004

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-3, 5-10, 12-14, and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levine (U.S. Patent No. 4,666,796) in view of Kim et al. (U.S. Publication No. 2003/0104651 A1) and Suzuki (Japanese Publication No. 2005-123297 A).

With respect to claim 1, Levine discloses in Figure 2, a hermetic sealing cap [10] employed for an electronic component storage package including an electronic component storing member for storing an electronic component, comprising: a substrate [12]; a first layer [14], formed on the surface of said substrate, mainly composed of Ni; a second layer formed to be in contact with the surface of said first layer [18] (Levine Column 3, line 62- Column 4, line 14).

Levine fails to disclose a first layer contains a diffusion accelerator, a solder layer mainly composed of Sn formed on a region of the surface of said second layer to which said electronic component storing member is bonded, wherein said second layer is so formed so as to inhibit said first layer from diffusing into said solder layer at a first temperature and diffuse said first layer into said solder layer through said second layer when said solder layer bonds to said electronic component storing member at a second temperature higher than said first temperature.

Suzuki discloses a first layer contains a diffusion accelerator (see Paragraph

[0033]-[0034]; Cobalt is a diffusion accelerator).

Suzuki fails to disclose a solder layer mainly composed of Sn formed on a region of the surface of said second layer to which said electronic component storing member is bonded, wherein said second layer is formed so as to inhibit said first layer from diffusing into said solder layer at a first temperature and diffuse said first layer into said solder layer through said second layer when said solder layer bonds to said electronic component storing member at a second temperature higher than said first temperature.

Kim discloses a solder layer mainly composed of Sn formed on a region of the surface of said second layer to which said electronic component storing member is bonded (see Paragraph [0031]-[0032])

Kim fails to disclose said second layer is formed so as to inhibit said first layer from diffusing into said solder layer at a first temperature and diffuse said first layer into said solder layer through said second layer when said solder layer bonds to said electronic component storing member at a second temperature higher than said first temperature.

While the said second layer is formed so as to inhibit said first layer from diffusing into said solder layer at a first temperature and diffuse said first layer into said solder layer through said second layer when said solder layer bonds to said electronic component storing member at a second temperature higher than said first temperature are not explicitly disclosed, it is understood that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior

art. If the prior art structure is capable of performing the intended use, then it meets the claim.

It would have been obvious to one of ordinary skill in the art at the time of invention that the second layer would inherently inhibit the first layer from diffusing into the solder layer at a first temperature as well as diffusing said first layer into said solder layer through said second layer when said solder layer bonds to said storing member at a second temperature higher than said first temperature as both the prior art and the claimed invention are structurally analogous and the structure of the prior art is capable of performing the intended use. It would have also been obvious to one of ordinary skill in the art at the time of invention to implement a diffusion accelerator in the first layer, of the Levine's cap, as taught by Suzuki in order to control the diffusion of nickel and produce a long term reliability of the layer (see Suzuki, Paragraph [0035]). It would have further been obvious to one of ordinary skill in the art at the time of invention to implement Kim's soldering layer on the system as disclosed by the combination of Levine and Suzuki in order to properly seal and maintain the sealant on the package cap onto the main package compartment (see Kim, Paragraph [0030])

With respect to claim 2, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 1 and further discloses said first temperature is a temperature at a time of forming said solder layer by melting solder paste (see Kim, Paragraph [0032]), and said second temperature is a temperature at a time of bonding said hermetic sealing cap to said electronic component storing member by melting said solder layer (see Kim, Paragraph [0035]).

With respect to claim 3, the combination of Levine, Suzuki, and Kim discloses all material as stated in claims 1 and 2 and further discloses said second layer is made of Ni (see Levine, Column 4, line 9-36).

With respect to claim 5, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 1 and further discloses said first layer contains 7.5 mass% to 20 mass% of Co as said diffusion accelerator (see Suzuki, Paragraph [0033]-[0034]).

With respect to claim 6, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 1 and further discloses said substrate is made of an Fe-Ni-Co alloy (see Levine, Column 4, lines 46-57).

With respect to claim 7, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 1 and further discloses said first layer and said second layer are formed by plating (see Levine, Column 2, lines 15-23).

With respect to claim 8, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 7 and further discloses said first layer is formed on the whole area of the surface of said substrate, and said second layer is formed on the whole area of the surface of said first layer (see Levine, Figure 2).

With respect to claim 9, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 1 and further discloses said solder layer contains no Pb, and contains Ag (see Kim, Paragraph [0031]).

With respect to claim 10, Levine discloses an electronic component storage package including an electronic component storing member for storing an electronic component, comprising: a hermetic sealing cap [10] including a substrate [12], a first

layer [14], formed on the surface of said substrate, mainly composed of Ni, a second layer [18] formed to be in contact with the surface of said first layer (Levine Column 3, line 62- Column 4, line 14).

Levine fails to teach a first layer containing a diffusion accelerator, a solder layer mainly composed of Sn formed on a region of the surface of said second layer to which said electronic component storing member is bonded, with said second layer is formed so as to inhibit said first layer from diffusing into said solder layer at a first temperature and diffuse said first layer into said solder layer through said second layer when said solder layer bonds to said electronic component storing member at a second temperature higher than said first temperature, wherein a third layer is formed on a portion of said electronic component storing member corresponding to said solder layer, said solder layer and said third layer are bonded to each other, and an intermetallic compound containing Sn of said solder layer is formed on the junction between said hermetic sealing cap and said electronic component storing member.

Suzuki teaches a first layer containing a diffusion accelerator (see Paragraph [0033]-[0034]; Cobalt is a diffusion accelerator).

Suzuki fails to teach a solder layer mainly composed of Sn formed on a region of the surface of said second layer to which said electronic component storing member is bonded, with said second layer having a function of inhibiting said first layer from diffusing into said solder layer at a first temperature while diffusing said first layer into said solder layer through said second layer when said solder layer bonds to said electronic component storing member at a second temperature higher than said first

temperature, wherein a third layer is formed on a portion of said electronic component storing member corresponding to said solder layer, said solder layer and said third layer are bonded to each other, and an intermetallic compound containing Sn of said solder layer is formed on the junction between said hermetic sealing cap and said electronic component storing member.

Kim teaches a solder layer mainly composed of Sn formed on a region of the surface of said second layer to which said electronic component storing member is bonded (see Paragraph [0031]-[0032]), wherein a third layer [10] is formed on a portion of said electronic component storing member corresponding to said solder layer, said solder layer and said third layer are bonded to each other, and an intermetallic compound containing Sn of said solder layer is formed on the junction between said hermetic sealing cap and said electronic component storing member (see Figure 5B and Paragraph [0036]-[0037]).

Kim fails to teach with said second layer having a function of inhibiting said first layer from diffusing into said solder layer at a first temperature while diffusing said first layer into said solder layer through said second layer when said solder layer bonds to said electronic component storing member at a second temperature higher than said first temperature

While the said second layer has a function of inhibiting said first layer from diffusing into said solder layer at a first temperature while diffusing said first layer into said solder layer through said second layer when said solder layer bonds to said electronic component storing member at a second temperature higher than said first

temperature are not explicitly disclosed, it is understood that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

It would have been obvious to one of ordinary skill in the art at the time of invention that the second layer would inherently inhibit the first layer from diffusing into the solder layer at a first temperature as well as diffusing said first layer into said solder layer through said second layer when said solder layer bonds to said storing member at a second temperature higher than said first temperature as both the prior art and the claimed invention are structurally analogous and the structure of the prior art is capable of performing the intended use. It would have also been obvious to one of ordinary skill in the art at the time of invention to implement a diffusion accelerator in the first layer, of the Levine's cap, as taught by Suzuki in order to control the diffusion of nickel and produce a long term reliability of the layer (see Suzuki, Paragraph [0035]). It would have further been obvious to one of ordinary skill in the art at the time of invention to implement Kim's soldering layer on the system as disclosed by the combination of Levine and Suzuki in order to properly seal and maintain the sealant on the package cap onto the main package compartment (see Kim, Paragraph [0030])

With respect to claim 12, Levine discloses in Figure 2, a method of manufacturing a hermetic sealing cap employed for an electronic component storage package including an electronic component storing member for storing an electronic

component, comprising steps of: preparing a substrate [12]; forming a first layer [14] mainly composed of Ni on the surface of said substrate; forming a second layer [18] on the surface of said first layer (Levine Column 3, line 62- Column 4, line 14).

Levine fails to disclose a first layer containing a diffusion accelerator and forming a second layer on the surface of said first layer; and forming a solder layer mainly composed of Sn at a first temperature on a region of the surface of said second layer to which said electronic component storing member is bonded with the second layer inhibiting said first layer from diffusing into said solder layer at the first temperature, wherein said second layer is formed such that said first layer diffuses into said solder layer through said second layer when said solder layer bonds to said electronic component storing member at a second temperature higher than said first temperature.

Suzuki teaches a first layer containing a diffusion accelerator (see Paragraph [0033]-[0034]; Cobalt is a diffusion accelerator)

Suzuki fails to teach forming a solder layer mainly composed of Sn on a region of the surface of said second layer to which said electronic component storing member is bonded with the second layer inhibiting said first layer from diffusing into said solder layer at the first temperature, wherein said second layer is formed such that said first layer diffuses into said solder layer through said second layer when said solder layer bonds to said electronic component storing member at a second temperature higher than said first temperature.

Kim teaches forming a solder layer mainly composed of Sn at a first temperature on a region of the surface of said second layer to which said electronic component

storing member is bonded with the second layer (see Figure 4, Paragraph [0031]-[0032]; laminated through heat constitutes a first temperature)

Kim fails to teach wherein the second layer inhibiting said first layer from diffusing into said solder layer at the first temperature, wherein said second layer is formed such that said first layer diffuses into said solder layer through said second layer when said solder layer bonds to said electronic component storing member at a second temperature higher than said first temperature.

While it is not explicitly disclosed inhibiting said first layer from diffusing into said solder layer at the first temperature, wherein said second layer is formed such that said first layer diffuses into said solder layer through said second layer when said solder layer bonds to said electronic component storing member at a second temperature higher than said first temperature, it is understood that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

It would have been obvious to one of ordinary skill in the art at the time of invention that the intended use includes no procedural change, merely a material requirement and second layer would function to inhibit said first layer from diffusing into said solder layer when forming said solder layer at a first temperature while diffusing said first layer into said solder layer through said second layer when said solder layer bonds to said electronic component storing member at a second temperature higher

than said first temperature as both the prior art and the claimed invention are structurally analogous and the structure of the prior art is capable of performing the intended use. It would have also been obvious to one of ordinary skill in the art at the time of invention to implement a diffusion accelerator in the first layer, of the Levine's cap, as taught by Suzuki in order to control the diffusion of nickel and produce a long term reliability of the layer (see Suzuki, Paragraph [0035]). It would have further been obvious to one of ordinary skill in the art at the time of invention to implement Kim's formation of a soldering layer on the system as disclosed by the combination of Levine and Suzuki in order to properly seal and maintain the sealant on the package cap onto the main package compartment (see Kim, Paragraph [0030])

With respect to claim 13, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 12 and further discloses the step of forming said solder layer includes steps of arranging solder paste mainly composed of Sn on a region of the surface of said second layer to which said electronic component storing member is bonded and forming said solder layer mainly composed of said Sn by melting said solder paste at said first temperature (see Kim Figure 4, and Paragraph [0030]).

With respect to claim 14, the combination of Levine, Suzuki, and Kim discloses all material as stated in claims 12 and 13 and further discloses, wherein said second layer is made of Ni (see Levine, Column 4, line 9-36).

With respect to claim 16, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 12 and further discloses said first layer contains 7.5 mass % to 20 mass % of Co as said diffusion accelerator (see Suzuki, Paragraph [0033]-

[0034]).

With respect to claim 17, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 12 and further discloses, said substrate is made of an Fe-Ni-Co alloy (see Levine, Column 4, lines 46-57).

With respect to claim 18, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 12 and further discloses the step of forming said first layer includes a step of forming said first layer by plating, and the step of forming said second layer includes a step of forming said second layer by plating (see Levine, Column 2, lines 15-23).

With respect to claim 19, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 18 and further discloses the step of forming said first layer by plating includes a step of forming said first layer on the whole area of the surface of said substrate, and the step of forming said second layer by plating includes a step of forming said second layer on the whole area of the surface of said first layer (see Levine, Figure 2).

With respect to claim 20, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 12 and further discloses wherein said solder layer contains no Pb, and contains Ag (see Kim, Paragraph [0031]).

4. Claims 4 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levine (U.S. Patent No. 4,666,796) in view of Kim et al. (U.S. Publication No. 2003/0104651 A1) and Suzuki (Japanese Publication No. 2005-123297 as applied to claims 1-3 and 12-14 above, and further in view of Woolhouse et al. (U.S. Patent No.

4,236,296; hereinafter referred to as Woolhouse).

With respect to claim 4, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 3 but fails to disclose said second layer has a thickness of at least 0.03 μm and not more than 0.075 μm.

Woolhouse discloses said second layer has a thickness of at least 0.03 μm and not more than 0.075 μm (see Column 3, lines 14-18; thin plating using nickel).

It would have been obvious to one of ordinary skill in the art at the time of invention to implement a second layer within the range of at least 0.03 μm and not more than 0.075 μm in order to produce a layer that is both thick enough to properly passivate the layers below while thin enough for allowing for proper placement of the layer (see Column 3, lines 36-43)

With respect to claim 15, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 14 but fails to disclose said second layer has a thickness of at least 0.03 μm and not more than 0.075 μm

Woolhouse discloses said second layer has a thickness of at least 0.03 μm and not more than 0.075 μm (see Column 3, lines 14-18; thin plating using nickel).

It would have been obvious to one of ordinary skill in the art at the time of invention to implement a second layer within the range of at least 0.03 μm and not more than 0.075 μm in order to produce a layer that is both thick enough to properly passivate the layers below while thin enough for allowing for proper placement of the layer (see Column 3, lines 36-43)

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Levine (U.S. Patent No. 4,666,796) in view of Kim et al. (U.S. Publication No. 2003/0104651 A1) and Suzuki (Japanese Publication No. 2005-123297 A) as applied to claim 10 above, and further in view of Shiomi et al (U.S. Publication No. 2004/0023487 A1; hereinafter referred to as Shiomi).

With respect to claim 11, the combination of Levine, Suzuki, and Kim discloses all material as stated in claim 10 and further discloses a portion of said second layer corresponding to the junction between said hermetic sealing cap and said electronic component storing member diffuses in said intermetallic compound, but fails to disclose the junction between said hermetic sealing cap and said electronic component storing member contains an intermetallic compound consisting of an Ni-Sn alloy.

Shiomi teaches the junction between said hermetic sealing cap and said electronic component storing member contains an intermetallic compound consisting of an Ni-Sn alloy (see Paragraph [0013]).

It would have been obvious to one of ordinary skill in the art at the time of invention to implement Shiomi's junction containing an Ni-Sn alloy in order to quickly form a compound at a low temperature and suppress deterioration in the characteristics of the electronic component due to heating performed for the fusion welding. (see Shiomi Paragraph [0013]).

(10) Response to Argument

With respect to arguments in regards to the assertion that Levine, Suzuki and Kim do not disclose "a first layer ... containing a diffusion accelerator," "a solder layer mainly composed of Sn formed on a region of the surface of said second layer to which said electronic component storing member is bonded, wherein said second layer is formed so as to inhibit said first layer from diffusing into said solder layer at a first temperature and diffuse said first layer into said solder layer through said second layer

when said solder layer bonds to said electronic component storing member at a second temperature higher than said first temperature," Appellant has argued that because of the difference in the function of the layers the order of the layers being different, the combination of the layers does not create the hermetic sealing cap of claim 1. However, Examiner respectfully disagrees. By utilizing the Ni-Co layer of Suzuki in layer 1 [14] of Levine as disclosed in the previous rejection in claim 1, the layer orientation is Ni-Co (layer [14] of Levine Figure 2), Ni [18], and Au [20]. This follows the orientation of the layer structure of claim 1. Furthermore, Suzuki supports this orientation by identifying the same issue of oxidizing corrosion. By implementing this Ni-Co layer in the first layer, this controls diffusion of nickel components within the layer of gold between the first and second layer which would cause a lower deterioration of the interior layers and preventing the body from becoming positively charged (see Suzuki ¶[0033-0034] and Levine, Column 4, lines 41-64). This creates the hermetic sealing cap structure of claim 1. Furthermore, as stated in Levine, the multi-layered structure protects the inner layers from further deterioration and reduces EMF difference that causes diffusion of the inner layers therefore the second layer of Ni inherently inhibits the first layers from diffusing out into the solder layers (see Levine, Column 4, line 65- Column 5, line 8) as the same materials (Ni-Co and Co) are used as well as the same orientation of layers are implemented between the prior art and the instant case.

Appellant also argues that Examiner's allegations of the term "accelerator" ignores ordinary meaning and consistent use of the word. However, based on the definition of acceleration in physics and statistical mechanics, acceleration is the rate of

change of velocity over time and does not necessitate the need for the system to increase in velocity as argued by the Appellant. Furthermore, Appellant's disclosure also keeps the acceleration of the system vague as to whether it is an increase or decrease in speed, but merely notes whether diffusion occurred or not. With no indication of increase in speed by the appellant in the disclosure (no rates or changes are provided), Examiner provided the same material utilized by the appellant for a diffusion accelerator (Cobalt; see rejection above, claim 1 and page 28 Paragraph 3 of the Appellant's specification). Therefore, it would be expected that based on the disclosure of the Appellant as well as the prior art of the record that Cobalt (Co) would function identically in both the combination of Levine, Suzuki, and Kim as the instant application. Furthermore, based on the translation used by the Examiner (attached for convenience), states:

[0034] According to the wiring board of this invention, the nickel cobalt layer 10 is formed directly under the gold layer 11. Since a cobalt component ***controls*** *diffusion of nickel components, some nickel of the nickel layer 9 or the nickel cobalt layer 10 diffuses the inside of the gold layer 11, and it exposes to the surface of the gold layer 11..." (emphasis added).*

By this translation, the cobalt component controls diffusion and does not inhibit or slow down the diffusion, thereby controls the rate of diffusion (i.e., an accelerator) and allows for nickel to diffuse into the outer gold layer. Therefore, since materially and functionally, the diffusion accelerators are identical in both the instant application as well

as the prior art, Examiner's cobalt in the nickel-cobalt layer is considered an "accelerator" by definition.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/STEVEN LOKE/

Supervisory Patent Examiner, Art Unit 2818

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